

Using angle calculations to demonstrate vowel shifts: A diachronic investigation of FOOT-fronting in 20th-century RP (UK)

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The use of instrumental phonetic methods in the analysis of phonetic variation is a well-established and integral part of quantitative sociophonetic studies, especially of vowels (Labov 1994, Thomas 2001). Recently, work has been carried out to

- a) Develop a new 'centre of gravity' -based normalisation procedure which better enables visual comparisons of vowel formant plots from different sources, and avoids some of the disadvantages of more well-known procedures (Watt and Fabricius 2003).
- b) Define geometrical measures of the configurational relations between average vowel positions on formant plots to aid the replicable interpretation of diachronic change in vowel systems, in the form of angle and Euclidean distance calculations (Fabricius, forthcoming).

The present paper is part of this ongoing work, whose overall aim is to unite phonetic and sociolinguistic views of diachronic change in vowel positions and configurations. Cross-fertilisation between the two paradigms can further the development of rigorous and replicable methods of representing the progress of changes such as vowel configurational shifts within speech communities.

The paper will apply the angle-calculation method of b) above to data illustrating the well-known FOOT-fronting and unrounding movement in British English, using a corpus of RP data from different types of recordings and different age groups. Comparisons will be made with an earlier study of the TRAP-STRUT configuration in the same data. Methodological issues such as arguments for and against certain normalisation procedures will also be touched upon.

Fabricius, Anne H. (forthcoming) Variation and change in the TRAP and STRUT vowels of RP: a real time comparison of five acoustic data sets. To appear in *Journal of the International Phonetic Association*, 2007.

Labov, William. 1994. *Principles of Linguistic Change* volume 1: *internal factors*. Oxford: Blackwell.

Thomas, Erik R. 2001. *An acoustic analysis of vowel variation in New World English*. Publications of the American Dialect Society 85.

Watt, Dominic and Anne Fabricius. 2003. Evaluation of a technique for improving the mapping of multiple speakers' vowel spaces in the F_1 ~ F_2 plane. *Leeds Working Papers in Linguistics*. 9:159-173.